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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Steven D Kloos

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EXAMINER

MENON, KRISHNAN S

ART UNIT

PAPER NUMBER

1797

MAIL DATE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/516,579	Applicant(s) KLOOS ET AL.	
	Examiner Krishnan S. Menon	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 74-92 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 74-92 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 74-92 are pending as amended 11/26/08 in the RCE of 6/6/08.

Claim Rejections - 35 USC § 112

A. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 89-92 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 89-92 recite void volumes of 50, 60, 70 and 80%, which does not appear to be having support in the original specification or claims.

B. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 74-92 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims recite *inter alia* H-values and void volumes of a permeate carrier without reciting any specific structure and membrane having a capability to reject MgSO₄ to

>50%. Of these, the MgSO₄ rejection is a membrane characteristic independent of the H-value or the void volume of the permeate carrier. The specification discloses H-value as a product side pressure drop parameter, and depends on the friction factor, fluid viscosity and the hydraulic diameter of the channel.

$$H = \frac{fL4\mu}{d_h^3}$$

Thus H is dependant on the process fluid characteristics and certain dimensions of the material, and there can be several different permeate carrier materials having different combinations of dimensions and process fluids that would meet the same H-value and void volumes, which would make this claim indefinite, because one of ordinary skill in the art would not be able to identify the metes and bounds of the claims.

Claim Rejections - 35 USC § 103

Claims 74-92 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Uhlinger (US 6,190,556) and Lien (US 4,802,982).

Claim interpretation: The claims are limited to a [spiral wound] membrane device having one or more first and second membrane sheets separated by a permeate carrier, the permeate carrier having certain “H” value [and void volume]. The membrane has certain “A” value. Claims also recite permeate carrier thickness, and the characteristics of the membrane such as MgSO₄ rejection, lengths and widths of the membrane leaves, etc.

The parameters H and A are defined by Lien. Lien also teaches how to optimize these factors for improving the performance of the spiral wound membrane elements. Discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. In re Boesch and Slaney, 205 USPQ 215 (CCPA 1980); In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977); “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Definitions of H and A (page 6 of applicant’s specification):

A is the membrane permeability, which is a membrane characteristic.

H is defined as a product side pressure drop parameter, and depends on the friction factor, fluid viscosity and the hydraulic diameter of the channel. Of these, at least the fluid viscosity is operating fluid-dependent and unrelated to the device claimed. Friction factor is a combination of material and flow characteristics. Thus what is accomplished by these equations is a method of optimizing the membrane cartridge design for certain operations conditions. From the definition of H, it is very clear that many different designs of permeate spacer material could have the same/similar range of values for H. Thus reciting values for these parameters in the claim would not make them patentable without specific structure and also a showing of secondary evidence for patentability. Lien also teaches a permeate carrier having an H-value of 0.045 and less – see table 2.

Uhlinger'556 teaches membrane devices capable of salt rejection >50% (col 8

lines 1-37: discusses monovalent and divalent salts). Even though MgSO_4 is not specifically taught, it would be obvious to one of ordinary skill in the art that MgSO_4 will have similar rejections. Uhlinger'556 teaches the membrane permeability (A value) for reverse osmosis and nanofiltration membranes as ranging from 10 to over 60 (see the typical flux data in column 2, lines 1-10 and column 8, lines 15-37 for commercial membranes). Uhlinger'556 does not teach the H and β values, thickness of permeate carrier or leaf length. Lien'982 teaches all these parameters and how to optimize the design based on these parameters (see columns 7-9, tables and working examples). It would be obvious to one of ordinary skill in the art at the time of invention to use the teachings of Lien'982 in the teaching of Uhlinger'556 to optimize the membrane device design for the desired performance. Even though none of these references teach specifics of leaf length and the number of leaves, leaf length and the number of leaves are variables that one of ordinary skill is capable of optimizing to provide the required membrane area for the desired permeate (product water) flow. The cross flow velocity of the feed is a process parameter, which has no structural relationship with the device claimed, and one of ordinary skill in the art is also capable of optimizing flow velocity from the feed quality, and the device specifics to minimize the pressure drop.

Regarding the specific dimensions of membrane elements, such as diameter 3.25" or less and 3-5 feet length: such elements are commercially available and commonly used in home-RO units. Even otherwise, they are not patentable. In *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference

between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) (The court held that the configuration of the claimed disposable plastic nursing container was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant.).

Defining a permeate carrier as a feed carrier as in claim 1 would not further limit the claim because it does not structurally limit the claim further. Void volumes of the carrier materials are inherently in the range claimed: see the description of the Conwed or Nalle materials in column 6, line 15 – column 7, line 6 of Lien, which also are similar to the typical feed spacer used in the spiral wound construction of the membrane cartridges.

Response to arguments traversing the rejection:

Regarding the interview summary, any agreement with “Examiner Dinh” would not be germane to the issues in this application. The only agreement Examiner Menon made was that the references did not literally state that *a feed spacer was used as a permeate spacer*. However, the teaching of Lien does describe the typical feed spacer material supplied by Conwed or Nalle Plastics as permeate carrier. Compare the definition of the permeate carrier preferred as 12 mil thick, having parallel thick strands

92 interconnected with fibrils 94 and the H values in Table 2, with applicant's disclosed carrier materials. ***Thus the teaching of Lien inherently anticipates the claims.***

No supporting evidence could be found on the long felt need and the unexpected results as argued; applicant has failed to show any such evidence.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S. Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Sample can be reached on 571-272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Krishnan S Menon/
Primary Examiner, Art Unit 1797